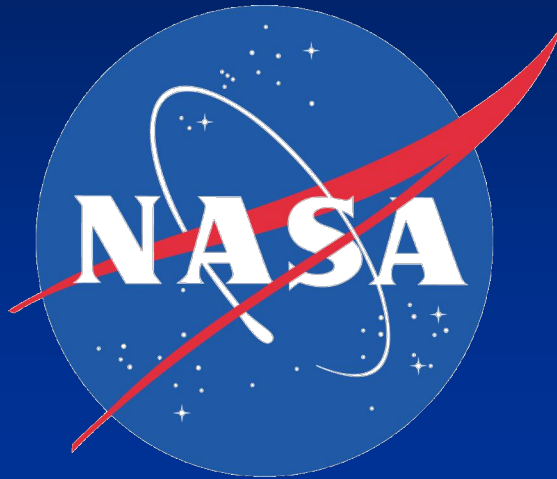


As Big as the State of Connecticut: NASA's Ecological Footprint

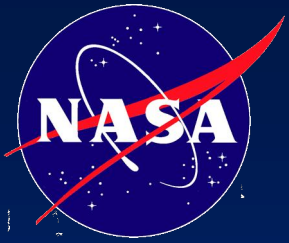


Christina Hudson
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May 25, 2005

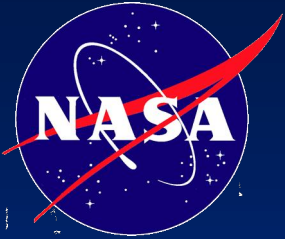
I. Sam Higuchi, Jr.
NASA Headquarters
Washington, DC
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Presentation Overview

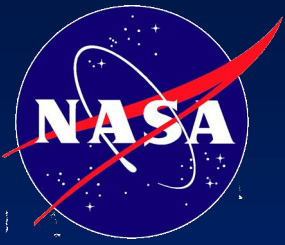
- Why an Ecological Footprint?
- Development Challenges
- Approach / Methodology
- Calculations
- Conclusions





Purpose of Ecological Footprint

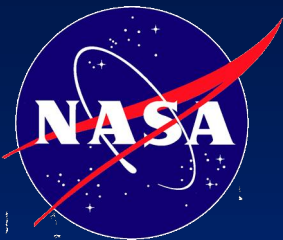
- Need to communicate progress
- Desire for “outcome-oriented” indicator
- Less federal experience with “sustainability” indicators



Development Challenges

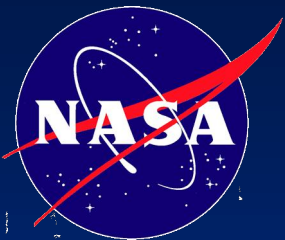
- Existing datasets are limited
- Data collection can be costly
- Need to integrate diverse data consistently
- Existing methodologies insufficiently transparent
- Little acceptance without collaborative process





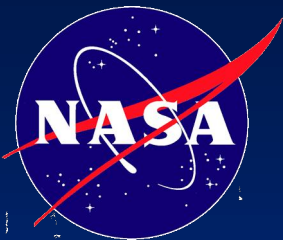
Footprint Approach

- Support NASA's mission and sustainability efforts
- “Learning-oriented” - applicable & understandable
- Produce snap shot of NASA's progress
- Support proactive management
- Minimize need for data collection



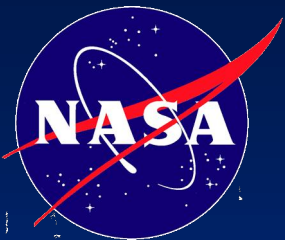
Footprint Methodology

- Use three-tiered system in spreadsheet tool
- Data sets are collected and imported
- Emissions calculated by operational sector
- Emissions converted to an *Ecological Footprint* - land area to absorb impacts



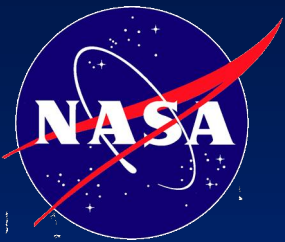
Tier I - Data Collection

- Data availability primary constraint
- Emissions calculated from NASA Environmental Tracking System (NETS) datasets and Centers resources, as available
- Collected Data Sectors/Modules include:
 - Energy Consumption Impacts
 - Building Impacts
 - Transportation Impacts
 - Limited Materials Usage Impacts



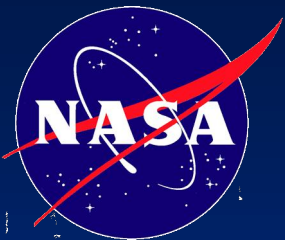
Tier II - Emission Metrics Calculation (1)

- Emission calculations use engineering estimates
- Calculated modules produce estimates for CO_2 , SO_x , and NO_x
- Limited ability for secondary pollutant emissions for PM, CO, CH_4 , and VOCs
- Conversions and calculations conservative



Tier II - Emission Metrics Calculation (2)

- Conversion factors use AP42/FIRE 6.24, e-Grid, GREET 1.5, BEES 3.0, and academic LCI conversion factors
- Flexible tool architecture for drop-in data substitutions as updates are available



Tier III - Ecological Footprints as Indicators

- Ecological footprint (EF) equals land area needed to absorb wastes and supply materials
- Land area metric aggregates and communicates results
- Increases compatibility for feedback mechanisms and future indicators



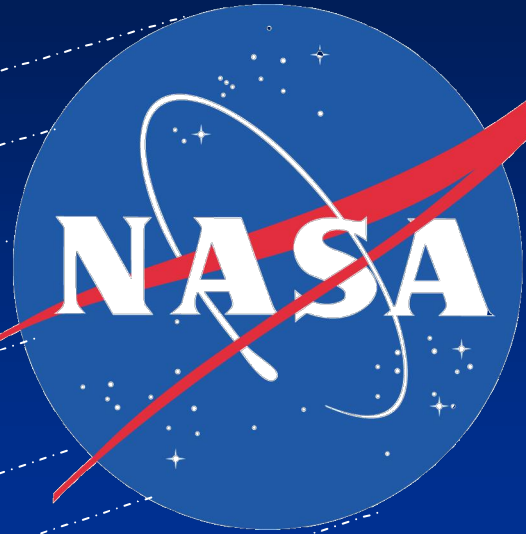
Calculating Footprints

2.6 mt/ha of CO₂ absorbed by...



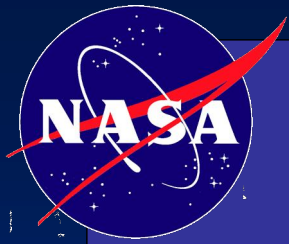
How Large is NASA's Ecological Footprint?

**The State of Connecticut
(4,845 Square Miles)**

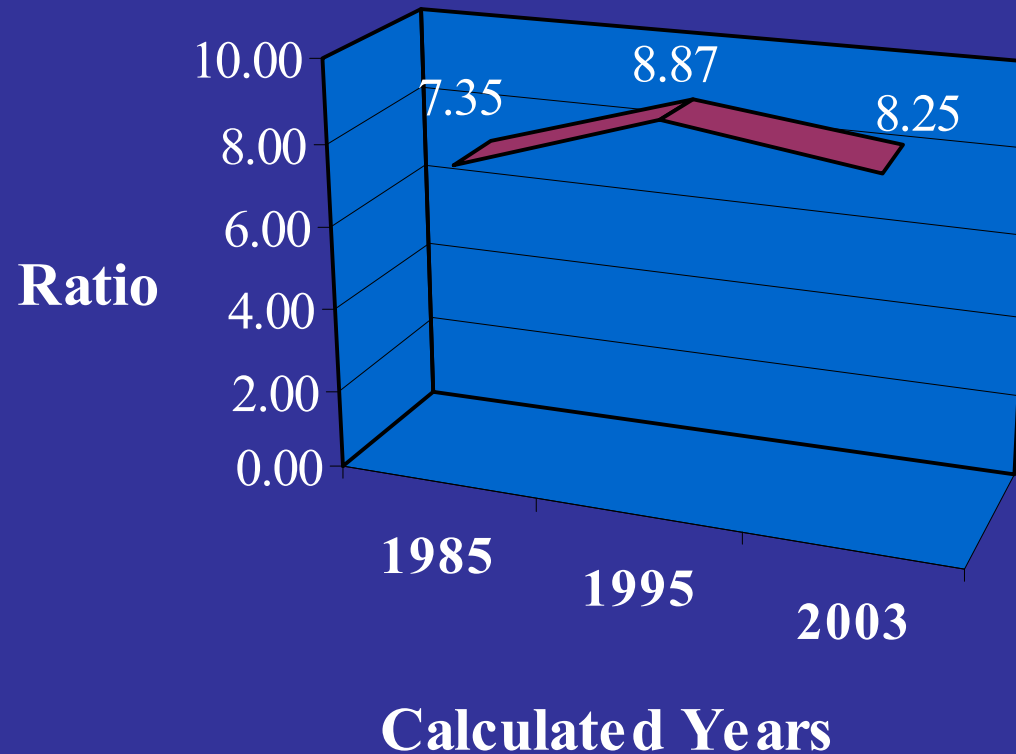


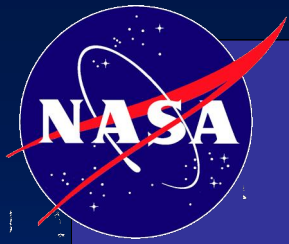
**In 2003, it was 4,679 Square
Miles, approximately the same
size as Connecticut!**

Note: Does not including Materials Usage module contributions.



NASA's Draft Ecological Footprint To Land Area Ratios 1985 - 2003

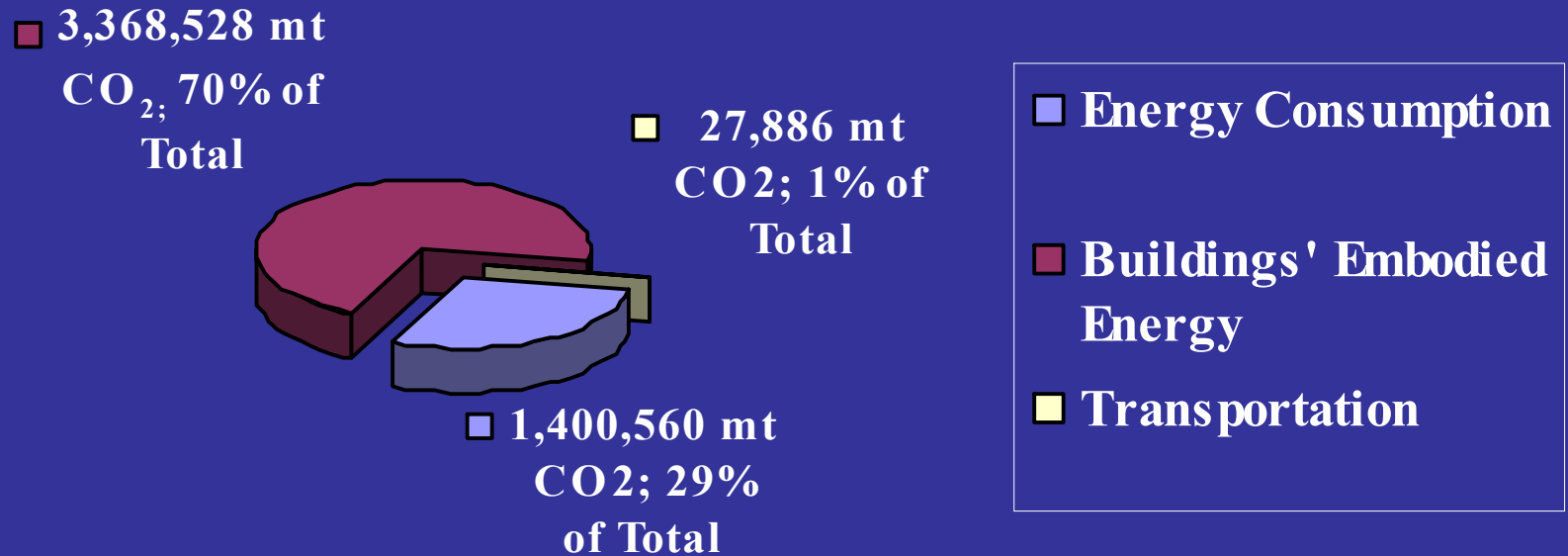


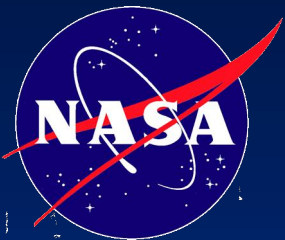


NASA Ecological Footprint Breakdown

By Sector Average

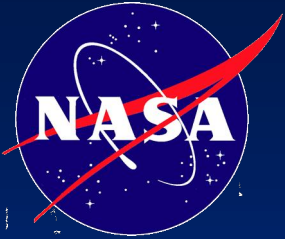
1985 -2003





Conclusions

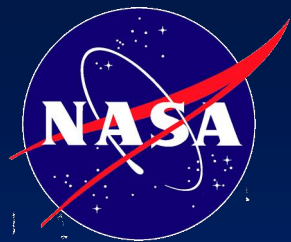
- Good start but not complete
- Flexible architecture
- Must integrate existing data
- Design to capture progress and communicate with all employees
- Incorporate lessons learned from federal discussion on integrated indicators



Next Steps

- Develop datasets for NASA/DOD building classifications
- Embed feedback mechanisms
- Develop Waste Disposal module
- Continue Land-Use and Water Resources Consumption module development





Means To An End

“If ***scientists*** supply accurate and reliable information,

policy makers can make intelligent and responsible decisions

to preserve an acceptable quality of life for our ***children and grandchildren.***”

For Questions:

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